

Momentum Review Sheet

AP Physics

1. Single-Object Momentum:
 - a. Variables (units): Momentum ($\text{kg}\cdot\text{m/s}$), mass (kg), velocity (m/s).
 - b. Equation.
2. Impulse-Momentum Theorem:
 - a. Variables (units): Force (N), change in time (s), momentum ($\text{kg}\cdot\text{m/s}$), mass (kg), change in velocity (m/s).
 - b. Impulse is defined as F times the change in time.
 - c. Equation.
3. Conservation of Momentum:
 - a. Initial momentum is equal to the final momentum.
 - b. More interesting if there is more than one object, so both initial momenta are added together and both final momenta are added together.
 - i. Equation.
4. Collisions:
 - a. (Perfectly) Elastic:
 - i. Hit and bounce; think billiard balls.
 - ii. Objects stay separate, so four terms in expanded equation.
 - iii. Momentum and kinetic energy conserved.
 - iv. Equation.
 - b. (Perfectly) Inelastic:
 - i. Hit and stick; think two pieces of putty.
 - ii. Masses combine in final case, so just one final velocity. Three terms in expanded equation.
 - iii. Momentum conserved, kinetic energy is NOT conserved.
 - iv. Equation.
 - c. In real world, no collision is ever perfectly elastic or inelastic.